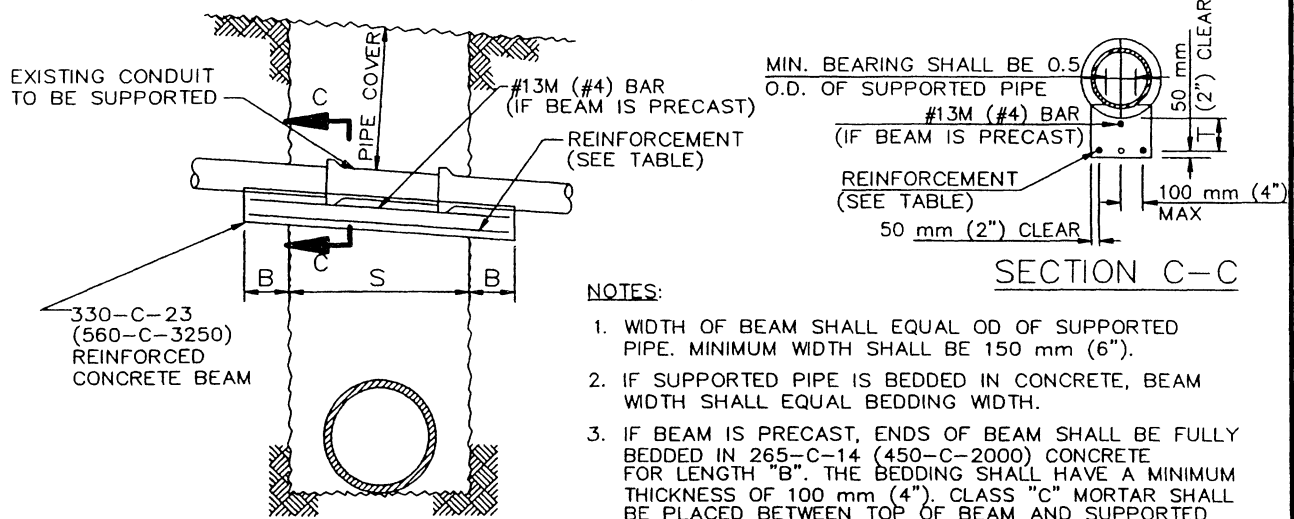


# CASE I REINFORCED CONCRETE BEAM

FOR 100 mm (4") TO 610 mm (24") ID PIPE



**NOTES:**

1. WIDTH OF BEAM SHALL EQUAL OD OF SUPPORTED PIPE. MINIMUM WIDTH SHALL BE 150 mm (6").
2. IF SUPPORTED PIPE IS BEDDED IN CONCRETE, BEAM WIDTH SHALL EQUAL BEDDING WIDTH.
3. IF BEAM IS PRECAST, ENDS OF BEAM SHALL BE FULLY BEDDED IN 265-C-14 (450-C-2000) CONCRETE FOR LENGTH "B". THE BEDDING SHALL HAVE A MINIMUM THICKNESS OF 100 mm (4"). CLASS "C" MORTAR SHALL BE PLACED BETWEEN TOP OF BEAM AND SUPPORTED PIPE TO PROVIDE MINIMUM BEARING SHOWN.
4. THIS CASE IS PERMITTED ONLY IF THE TRENCH WALLS ARE FIRM AND UNYIELDING.
5. MAXIMUM SPACING OF BARS SHALL BE 100 mm (4") OC.

REINFORCED CONCRETE BEAM (DIMENSIONS AND REINFORCEMENT)

S	PIPE COVER														
	0 m TO 2.4 m			2.4 m TO 3.7 m			3.7 m TO 4.9 m			4.9 m TO 6.0 m			6.0 m TO 7.6 m		
	(0' TO 8'-0")			(8'-0" TO 12'-0")			(12'-0" TO 16'-0")			(16'-0" TO 20'-0")			(20'-0" TO 25'-0")		
	T	BARS	B	T	BARS	B	T	BARS	B	T	BARS	B	T	BARS	B
8m TO 1.2m (0' TO 4'-0")	200mm (8")	#13M (#4)	0.50m (1'-6")	200mm (8")	#13M (#4)	0.50m (8")	230mm (9")	#13M (#4)	0.50m (1'-6")	255mm (10")	#13M (#4)	0.50m (1'-6")	270mm (10 1/2")	#13M (#4)	0.50m (1'-6")
1.2m TO 1.50m (4'-0" TO 5'-0")	200mm (8")	#13M (#4)	0.50m (1'-6")	250mm (9 1/2")	#13M (#4)	0.50m (1'-6")	280mm (11")	#13M (#4)	0.50m (1'-6")	305mm (12")	#13M (#4)	0.50m (1'-6")	320mm (12 1/2")	#16M (#5)	0.50m (1'-6")
1.5m TO 1.85m (5'-0" TO 6'-0")	230mm (9")	#13M (#4)	0.50m (1'-6")	280mm (11")	#16M (#5)	0.50m (1'-6")	320mm (12 1/2")	#16M (#5)	0.50m (1'-6")	340mm (13 1/2")	#16M (#5)	0.6m (2'-0")	370mm (14 1/2")	#16M (#5)	0.6m (3'-0")
1.85m TO 2.15m (6'-0" TO 7'-0")	255mm (10")	#16M (#5)	0.50m (1'-6")	320mm (12 1/2")	#16M (#5)	0.6m (2'-0")	370mm (14 1/2")	#16M (#5)	0.6m (2'-0")	395mm (15 1/2")	#16M (#5)	0.6m (2'-0")	420mm (16 1/2")	#19M (#6)	0.6m (2'-0")
2.15m TO 2.45m (7'-0" TO 8'-0")	280mm (11")	#16M (#5)	0.50m (1'-6")	355mm (14")	#16M (#5)	0.6m (2'-0")	410mm (16")	#16M (#5)	0.6m (2'-0")	445mm (17 1/2")	#16M (#5)	0.75m (2'-6")	485mm (19")	#19M (#6)	0.75m (2'-6")
2.45m TO 2.75m (8'-0" TO 9'-0")	320mm (12 1/2")	#16M (#5)	0.6m (2'-0")	395mm (15 1/2")	#19M (#6)	0.75m (2'-6")	445mm (17 1/2")	#19M (#6)	0.90m (3'-0")	495mm (19 1/2")	#19M (#6)	0.75m (2'-6")	535mm (21")	#19M (#6)	0.75m (2'-6")
2.75m TO 3.0m (9'-0" TO 10'-0")	340mm (13 1/2")	#19M (#6)	0.6m (2'-0")	430mm (17")	#19M (#6)	0.75m (2'-6")	495mm (19 1/2")	#19M (#6)	0.90m (3'-0")	545mm (21 1/2")	#19M (#6)	0.9m (3'-0")	585mm (23")	#19M (#6)	0.90m (3'-0")
3.0m TO 3.35m (10'-0" TO 10'-0")	370mm (14 1/2")	#19M (#6)	0.75m (2'-6")	470mm (18 1/2")	#19M (#6)	0.90m (3'-0")	535mm (21")	#19M (#6)	0.90m (3'-0")	595mm (23 1/2")	#22M (#7)	0.9m (3'-0")	635mm (25")	#22M (#7)	0.90m (3'-0")
3.35m TO 3.65m (11'-0" TO 12'-0")	395mm (15 1/2")	#19M (#6)	0.75m (2'-6")	510mm (20")	#19M (#6)	0.90m (3'-0")	585mm (23")	#22M (#7)	1.10m (3'-6")	650mm (25 1/2")	#22M (#7)	1.10m (3'-6")	685mm (27")	#22M (#7)	1.10m (3'-6")
3.65m TO 4.00m (12'-0" TO 13'-0")	430mm (17")	#19M (#6)	0.90m (3'-0")	545mm (21 1/2")	#22M (#7)	1.10m (3'-6")	625mm (24 1/2")	#22M (#7)	1.10m (3'-6")	700mm (27 1/2")	#22M (#7)	1.20m (4'-0")	740mm (29")	#22M (#7)	1.20m (4'-0")
4.00m TO 4.25m (13'-1" TO 14'-0")	455mm (18")	#22M (#7)	0.90m (3'-0")	585mm (23")	#22M (#7)	1.10m (3'-6")	675mm (26 1/2")	#22M (#7)	1.20m (4'-0")	750mm (29 1/2")	#22M (#7)	1.20m (4'-0")	800mm (31 1/2")	#22M (#7)	1.20m (4'-0")
4.25m TO 4.60m (14'-0" TO 15'-0")	485mm (19")	#22M (#7)	0.90m (3'-0")	635mm (25")	#22M (#7)	1.20m (4'-0")	710mm (28")	#22M (#7)	1.20m (4'-0")	800mm (31 1/2")	#22M (#7)	1.40m (4'-6")			
4.6m TO 4.90m (15'-0" TO 16'-0")	520mm (20 1/2")	#22M (#7)	1.10m (3'-6")	675mm (26 1/2")	#22M (#7)	1.20m (4'-0")	760mm (30")	#25M (#8)	1.40m (4'-6")						
4.90 TO 5.20m (16'-0" TO 17'-0")	545mm (21 1/2")	#22M (#7)	1.10m (3'-6")	710mm (28")	#25M (#8)	1.40m (4'-6")									
5.20m TO 5.50m (17'-0" TO 18'-0")	570mm (22 1/2")	#25M (#8)	1.40m (4'-6")	750mm (29 1/2")	#25M (#8)	1.40m (4'-6")									

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION

PROMULGATED BY THE  
PUBLIC WORKS STANDARDS INC.  
GREENBOOK COMMITTEE  
1984  
REV. 1996

## SUPPORTS FOR CONDUITS ACROSS TRENCHES

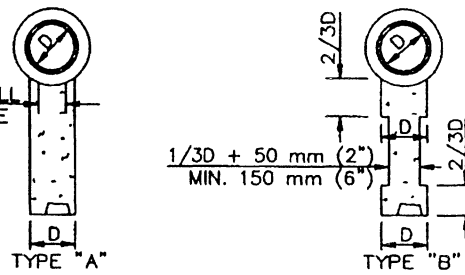
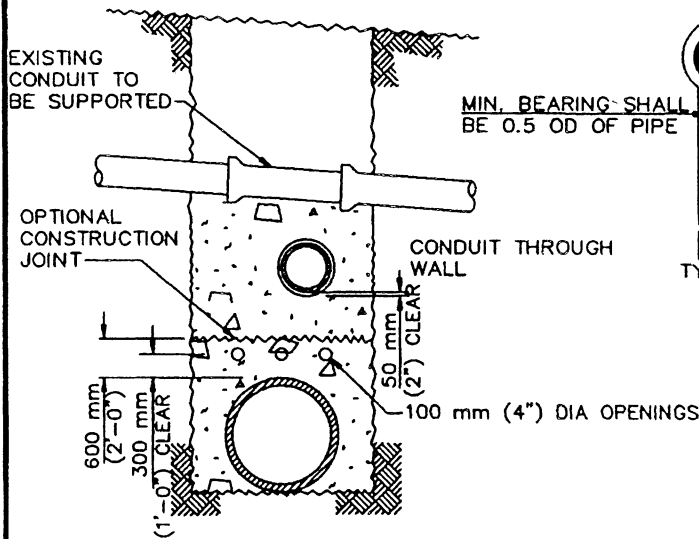
USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

STANDARD PLAN  
METRIC

# 224-1

SHEET 1 OF 3

## CASE 2 CONCRETE WALL

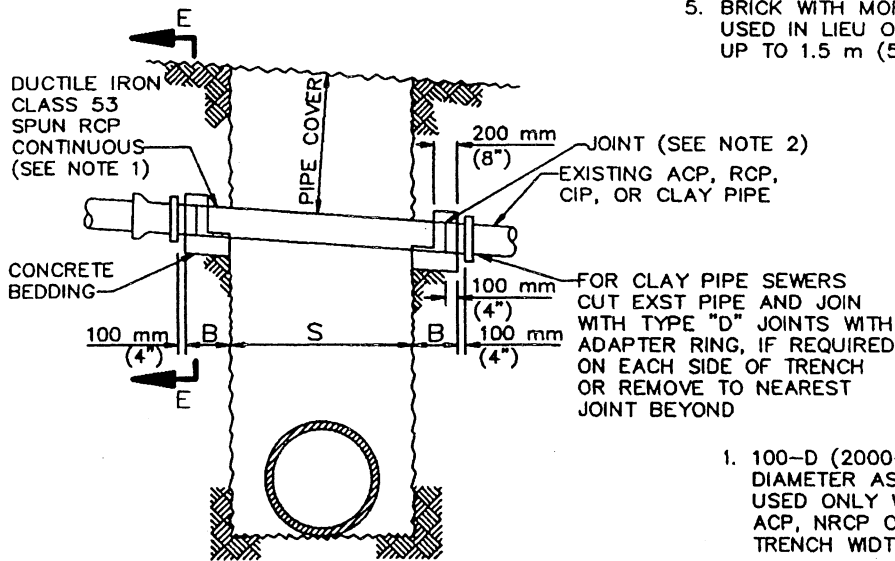


**WALL SECTION**

**NOTES**

1. THE SUPPORTING WALL SHALL HAVE A FIRM BEARING ON THE SUBGRADE AND AGAINST THE SLIDES OF THE EXCAVATION.
2. ANY CONDUIT PASSING THROUGH THE WALL SHALL HAVE 50 mm (2") CLEARANCE FROM THE WALL.
3. 100 mm (4") DIA OPENING THROUGH THE WALL AT 600 mm (2') OC HORIZONTALLY AND AT 1.5 m (5') OC VERTICALLY SHALL BE PROVIDED TO PREVENT UNEQUAL PRESSURE RESULTING FROM JETTED BACKFILL.
4. IF SUPPORTED PIPE IS BEDDED IN CONCRETE, MINIMUM THICKNESS OF WALL SHALL EQUAL BEDDING WIDTH.
5. BRICK WITH MORTAR JOINTS MAY BE USED IN LIEU OF CONCRETE FOR WALLS UP TO 1.5 m (5') IN HEIGHT OR LENGTH.

## CASE 3 DUCTILE IRON PIPE

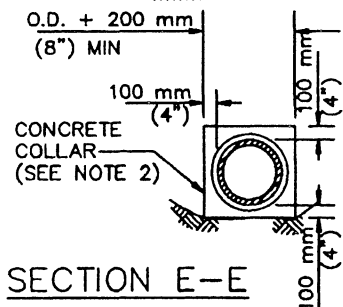


**NOTES**

1. 100-D (2000-D) SPUN RCP OF SAME DIAMETER AS THE EXISTING PIPE MAY BE USED ONLY WHEN THE EXISTING PIPE IS ACP, NRCP OR RCP AND THE TRENCH WIDTH IS 1.5 m (5') OR LESS.
2. THE CONCRETE COLLAR JOINT SHALL BE USED FOR JOINTS IN STORM DRAIN PIPE.

**ALLOWABLE SPANS AND MIN. REQUIRED BEARING FOR DUCTILE IRON PIPE**

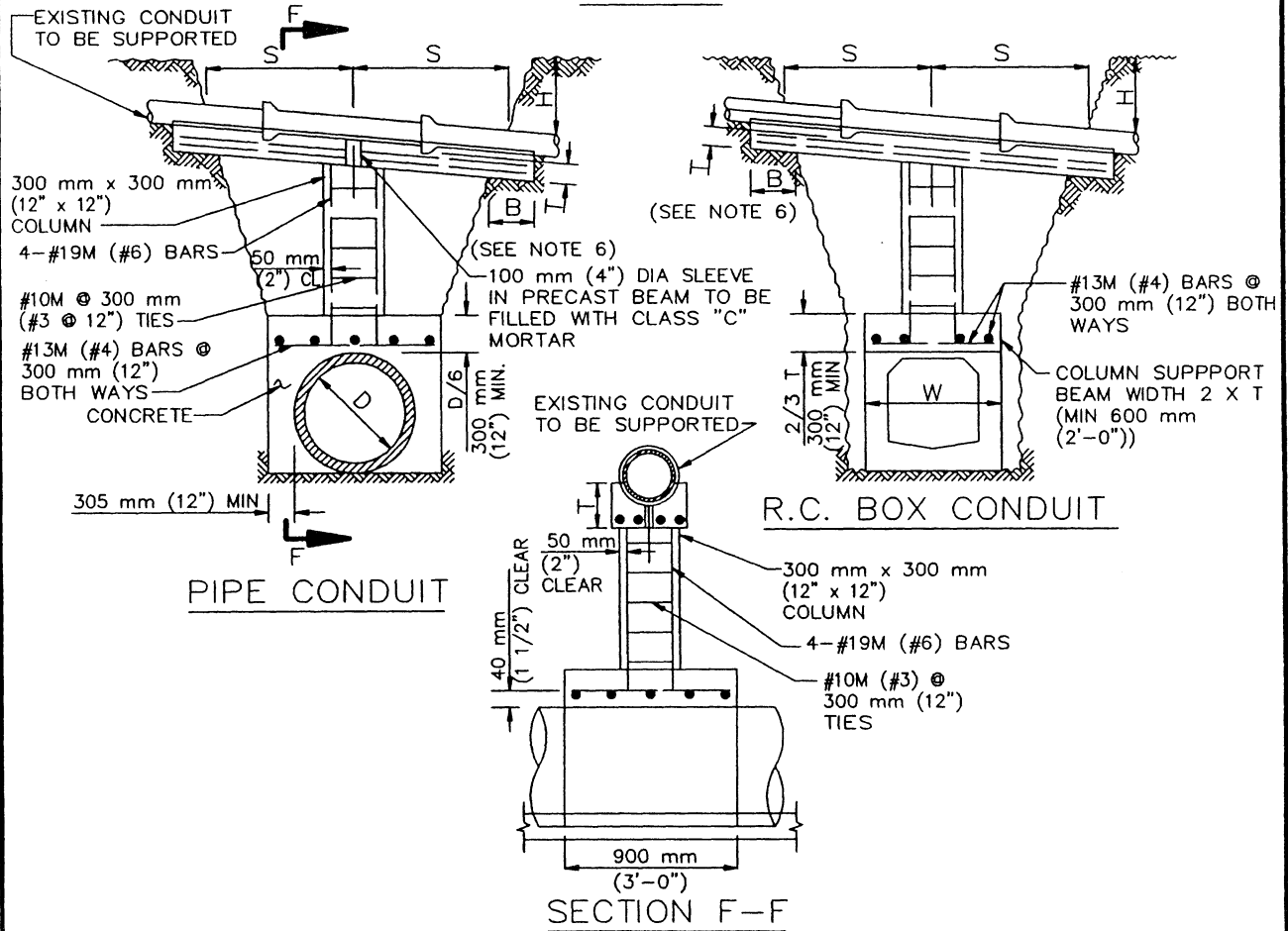
DEPTH OF COVER	150 mm (6") PIPE		200 mm (8") PIPE		250 mm (10") PIPE	
	S (Max)	B (Min)	S (Max)	B (Min)	S (Max)	B (Min)
0 m TO 2.45 m (0" TO 8'-0")	3.35 m (11'-0")	0.5 m (1'-6")	4.10 m (13'-6")	0.5 m (1'-6")	5.03 m (16'-6")	0.6 m (2'-0")
2.45 m TO 4.90m (8'-0" TO 16'-0")	2.45 m (8'-0")	0.5 m (1'-6")	3.00 m (10'-0")	0.6 m (2'-0")	3.66 m (12'-0")	0.6 m (2'-0")
4.90 m TO 7.60m (16'-0" TO 25'-0")	2.15 m (7'-0")	0.5 m (1'-6")	2.75 m (9'-0")	0.6 m (2'-0")	3.20 m (10'-6")	0.75 m (2'-6")



**SECTION E-E**

# COLUMN SUPPORT WITH REINFORCED CONCRETE BEAM

## CASE 4



### NOTES

- SPAN "S" SHALL BE MAXIMUM 5.5 m (18') FOR EARTH COVER 2.45 m (8') OR LESS, 3.65 m (12') FOR EARTH COVER 4.9 m (16') OR LESS, AND 3.0 m (10') FOR OVER 4.9 m (16') EARTH COVER.
- CONCRETE SHALL BE CLASS 330-C-23 (560-B-3250).
- WHEN THE PIPE TO BE SUPPORTED CROSSES THE TRENCH ON A SKEW ANGLE, THE WALL OR BEAM WHICH SUPPORTS THE COLUMN SHALL BE CONSTRUCTED AT RIGHT ANGLE TO THE TRENCH.
- SUPPORT SYSTEM MAY BE USED OVER CAST-IN-PLACE STRUCTURES.
- BACKFILL ABOVE THE SUPPORT BEAM SHALL NOT BE PLACED UNTIL 72 HOURS AFTER THE SUPPORT IS POURED.
- REINFORCED CONCRETE BEAM DIMENSIONED AND REINFORCED PER TABLE UNDER CASE 1.

### GENERAL NOTES

- "S" IS THE SPAN OF THE PIPE SUPPORT MEASURED ALONG ITS CENTERLINE.
- "B" IS THE LENGTH OF BEARING OF THE SUPPORT AGAINST UNDISTURBED EARTH MEASURED ALONG THE PIPE CENTERLINE.
- CASE 2 SHALL BE USED FOR PARTIAL CROSSINGS, EXCEPT THAT WHERE THE DISTANCE FROM A SEWER CHIMNEY TO UNDISTURBED EARTH IS 450 mm (18") OR LESS, THE TRENCH BACKFILL MAY BE DENSIFIED TO 450 mm (18") ABOVE A HOUSE CONNECTION SEWER AND THEN RE-EXCAVATED FOR THE PIPE INSTALLATION.
- ANY SEWER OR STORM DRAIN EXPOSED OR PARTIALLY EXPOSED IN A TUNNEL EXCAVATION SHALL BE SUPPORTED WITH A WALL, CASE 2.
- IF BEDDING IS REMOVED FROM THE EXISTING PIPE THAT WILL REMAIN IN PLACE, THE PIPE SHALL BE EMBEDDED WITH CONCRETE AT NO EXTRA COST TO THE AGENCY.
- UNLESS OTHERWISE INDICATED, CONCRETE SHALL BE CLASS 265-C-14 (450-C-2000).

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SHEET 3 OF 3